

Lantz and Becky--

Here are comments about the waste rock characterization report compiled by Peter Brinton. He offers several suggestions for future reports.

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From: **Peter Brinton** <peterbrinton@utah.gov>  
Date: Wed, Aug 8, 2012 at 12:03 PM  
Subject: Lisbon Valley rock characterization comments  
To: Tom Munson <TOMMUNSON@utah.gov>  
Cc: paulbaker@g.utah.gov

Hi Tom,

Here are some comments to pass on to Lisbon Valley that would make their annual waste rock characterization report and data more useful for the Division. There's a lot of helpful information in the report, and some areas where it could be clearer and where things are missing or incorrect. See what you think, and let me know if any of what I'm asking seems unreasonable.

### Lab Analysis

- I would expect that Lead and TDS (and possibly Chromium and Mercury) are pertinent to include in the MWMP testing and results. These analytes should be included the future in your MWMP results, unless justified otherwise.
- Ensure that the extraction pH represents meteoric water conditions, and that the extraction pH is consistent (there is some variation of the starting pH of samples analyzed in 2011 - MWMP vs. Modified MWMP).
- Ensure that particles sizes of analyzed MWMP samples are uniform (there is some significant variation in the particles sizes of samples analyzed in 2011).
- Ideally, the MWMP detection limits are at least equal to or lower than Utah's groundwater quality standards (arsenic and selenium had slightly higher limits than their standards in 2011).
- Please provide lab results for the AGP and ANP values for the drill pulp samples. The waste rock sampling plan in the approved Notice indicates that Net Neutralization Potential (NNP) will be determined using the calculating Acid Neutralization Potential (ANP) and Acid Generation Potential (AGP). In the 2011 report, it appears that only the ANP data has been provided, since the NaOH back titration test yields ANP values (per the titration analysis description in the waste rock sampling plan).

### Tables

- Consider the following format for Table 2 that would help make the report more usable to the Division:
  - 1) Order the data in Table 2 first by Rock Type (perhaps a sub-table for each bed), and then by Date.
  - 2) Report the average of the measured levels of MWMP metals and ABA values for each Rock Type (not just for all waste rock samples combined).(This would help the Division get a better, ongoing idea of the nature of each of the Rock Types. This will also help the Division clearly evaluate Rock Types for use as encapsulating materials or needing special handling.)
- Report the rock type for the drill pulp samples for which the ANP value is reported.
- Report the pH of leach effluent of the MWMP test in the table.
- Provide AGP and NNP values for the drill pulp samples.
- Indicate the significance of empty cells in the table (e.g. below detection limit, not sampled, etc).
- Provide a line in the table listing the detection limits for each analyte.
- Provide a line in the table listing the Utah groundwater discharge standards for each analyte for reference.

### Report

- Identify how composited bulk samples are generated for the MWMP testing (how many samples in the composite, etc).
- Identify whether any specific criteria is used to identify waste rock that is acceptable for encapsulation material.

- Identify the Rock Types used for encapsulating material at each encapsulation location.
- Justify or re-evaluate the conclusion that waste rock is "strongly acid neutralizing" based on net neutralization potential. ANP values from titration tests are referenced here as NNP values. NNP values for some Rock Types must be lower than the reported ANP values due to an AGP component. This will be important in determining appropriate encapsulation material and confirming potentially acid generating material.
- Make conclusions (updated annually) about the neutralizing nature of waste rock by Rock Type, based on the ABA (NNP, ANP, AGP) for each Rock Type.
- Make conclusions (updated annually) about the quality of water passing through waste rock from each Rock Type, based on baseline water quality and MWMP testing results for each Rock Type.

### **Maps**

- Legibly label major elevation contours on the encapsulation location map. Creating supplemental maps showing more localized locations of encapsulating material could be helpful.
- Identify the location of past years' deleterious material on the encapsulation location map. This type of map is ultimately needed to meet the requirements of the rules (R647-4-110.4).
- The pit map looks good.

Let me know if there are any questions or concerns.

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